



Memorandum

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RE: Monthly Report – May 6-31, 2012

1.0 INTRODUCTION

The National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) issued Apache Alaska Corporation (APACHE) an Incidental Harassment Authorization (IHA) under the authority of section 101(a)(5)(D) of the Marine Mammal Protection Act (16 U.S.C. 1361 *et seq.*) to harass small numbers of marine mammals, by Level B harassment, incidental to three-dimensional (3D) seismic surveys in Cook Inlet (hereafter *Cook Inlet 3D Seismic Program*) from April 2012 through April 2013.

This monthly report presents information requested in the IHA and Incidental Take Statement (ITS) for this reporting time period of **May 6-31, 2012** and includes information on the seismic operations, marine mammal monitoring and mitigation measures implemented. Protected Species Observer (PSO) daily reports which include details on the required information are not included in the monthly report because they were attached to the weekly reports previously sent to NMFS.

SUMMARY OF SIGHTINGS

Table 1. Summary of the number of sightings, shut downs and takes.

Marine Mammal Species	# Sightings	# Shut Downs	# Takes	# Cumulative Takes
Beluga Whale	26	1	0	0
Killer Whale	0	0	0	0
Harbor Porpoise	39	11	0	0
Steller Sea Lion	1	0	0	0
Harbor Seal	169	37	5	5
Other (describe)	1 gray whale	2 gray whale 2 false sightings	0	0
Unknown	4	1	0	0

2.0 SUMMARY OF OPERATIONS

The following table summarizes the seismic operations over this reporting period. More details are found in the following text.

Table 2. Total number of slack tides and hours per airgun.

Source	# of Slack Tides	# Hours
10 cui mitigation	NA	32.4
440 cui ultra-shallow (M/V Peregrine Falcon)	0	0
2400 cui (M/V Peregrine Falcon)	26	34.6
2400 cui (M/V Arctic Wolf)	65	97.2

Operations occurred in the general area of Trading Bay on the west side of Cook Inlet (Figure 1). All operations occurred in nearshore waters, within 6.5 miles offshore, between the town of Shirleyville and slightly to the north of the village of Tyonek. The two source vessels include the *M/V Arctic Wolf* and the *M/V Peregrine Falcon*. During seismic activity, the vessels traveled at speeds between 4-5 knots. As identified in the IHA application, marine seismic data are only acquired during low and high slack tides (approximately 2-3 hours over the tide). There are approximately 4 slack tides in a 24-hour period. Over the course of this reporting period, airguns operated for a total of 131.8 hours during a total of 91 slack tides. The 2400 cui airgun array operated from *Arctic Wolf* during 65 slack tides, for a total of approximately 97.2 hours. The *Peregrine Falcon* operated the 2400 cui airgun array during 26 slack tides for a total of approximately 34.6 hours. The mitigation gun was used on 17 different nights for a total of approximately 32.4 hours. The mitigation vessel, the *M/V Dreamcatcher*, was stationed to the north of the northern end of the patch for acoustic and visual monitoring during all periods of seismic operations.

The monitoring team consisted of two PSOs on the *Arctic Wolf*, two PSOs on the *Peregrine Falcon*, two PSOs on the *Dreamcatcher*, two PSOs at a land-based station (Shirleyville, Tyonek Dock or Bluff Site #1) and aerial overflights with one PSO. All PSOs operate on a 4-hour shift to avoid fatigue and only during daytime operations.

A radio-telemetered passive acoustic monitoring (PAM) buoy was deployed on May 10, 2012 to the north of the northern end of the patch for nighttime acoustic monitoring. However, the buoy turned over due to waves and currents; therefore, making transmission impossible. Because of inclement weather, the buoy was not retrieved until May 16. The buoy was damaged while deployed, and therefore, was not redeployed. Instead, it returned to Anchorage for maintenance and re-evaluation. Thus, an over-the-side (OTS) hydrophone was deployed from the *Dreamcatcher* during all nighttime operations with the engines off (but generators still on) for passive acoustic monitoring. The *Dreamcatcher* is positioned to the north of the seismic acquisition patch. Two acoustic technicians monitored for acoustic detections of marine mammals during all nighttime operations in 4-hour shifts. The reported detection range of small vessels on this hydrophone with the engines off was approximately 3 km.

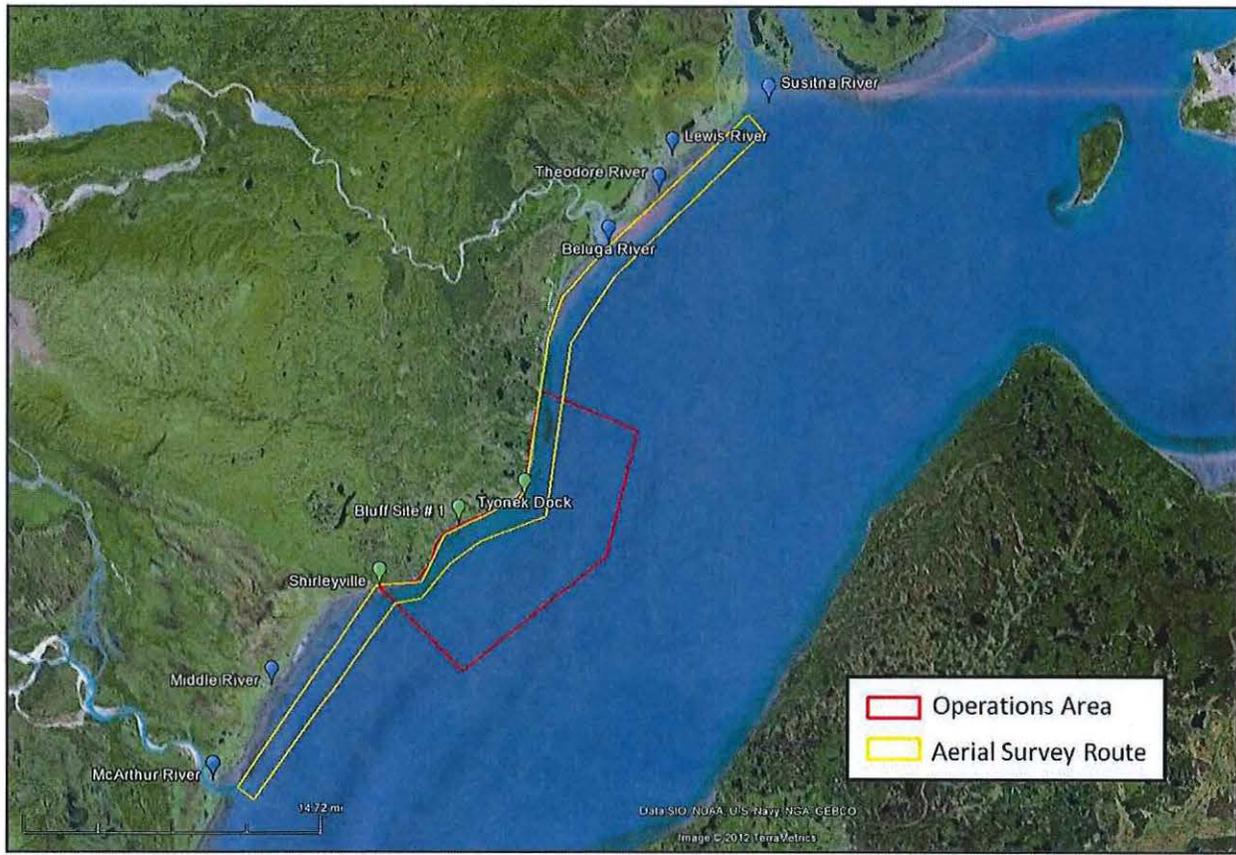


Figure 1. Operations occurred in the general area of Trading Bay on the west side of Cook Inlet (red polygon). The yellow polygon indicates the aerial survey route.

3.0 MONITORING EFFORT

A total of 2,176.1 hours of monitoring effort took place during the month of May including visual vessel- and land-based, passive acoustic monitoring and aerial surveys (Table 3).

Table 3. Total number of hours of monitoring per method.

Monitoring Method	Total # of Hours
Visual Vessel-based	1,095.9
Visual Land-based	708.5
Passive Acoustic Monitoring	355.0
Aerial Survey	16.7
Total	2,176.1

3.1 Environmental Conditions

In general, the environmental conditions were conducive to appropriately monitor marine mammals during seismic operations. The sea state ranged from 0 to 3 with an occasional 4, 5 or 6 on the Beaufort Sea State scale.

3.2 Marine Mammal Sightings

Visual Observations

Five marine mammal species were sighted during this month's monitoring effort including the beluga whale, gray whale, harbor porpoise, Steller sea lion and harbor seal (Table 4). There were four sightings of unknown marine mammal species. Details on the species sightings are described below and in the PSO Daily Reports.

Table 4. Total of individuals and sighting per species

Species	# of Individuals	# of Sightings
Beluga Whale	70	26
Killer Whale	0	0
Harbor Porpoise	48	39
Steller Sea Lion	1	1
Harbor Seal	167 ¹	169
Gray Whale	1	1
Unknown	4	4
Total	291	234

¹The total number of harbor seals only reflects the individuals sighted and does not include the total counts from the six haul out sightings observed during aerial surveys.

Beluga Whale

A total of 70 beluga whales were observed on 26 occasions. Beluga whales were observed traveling, diving, milling and foraging.

Gray Whale

One gray whale was observed in the project area on May 22. The gray whale was observed blowing, swimming, diving and milling. Operations ceased with initial sighting of the gray whale, but continued later that day when the whale was no longer in view. All night operations were discontinued because the gray whale remained in the area.

Harbor Porpoise

A total of 48 harbor porpoise were observed on 39 occasions. Harbor porpoise were observed traveling, swimming and porpoising.

Steller sea lion

On May 6, one Steller sea lion was observed swimming approximately 400 m away from the Arctic *Wolf*. No seismic activity was taking place at the time of the sighting.

Harbor Seal

Harbor seals were observed on 169 different occasions. There were 167 individuals observed on 163 occasions and six sightings of large numbers of seals hauled out or near the Lewis and Theodore Rivers. The number of seals hauled out ranged from 10 individuals to over 100. Harbor seals were observed traveling, swimming, diving, milling, foraging, bottlenosing, sinking, looking toward the vessel and resting.

Acoustic Observations

No marine mammal species were acoustically detected during this month's monitoring effort.

3.3 Marine Mammal Takes

During the month of May, there were five harbor seal takes (Table 5). The takes occurred on May 8, 11, 15 and 31 (Table 6). No other marine mammal species were taken during this time period.

Table 5. Number of marine mammal takes

Species	No. of Takes	Cumulative Level of Takes
Beluga whale	0	0
Harbor seal	5	5
Harbor porpoise	0	0
Killer whale	0	0
Steller sea lion	0	0

Table 6. Harbor seal takes

Date	Time	Behavior	Comments
May 8	17:40	Looked toward vessel and then dove	Seismic activity continued
May 11	10:36	Swimming and then sank without diving	Seismic activity continued
May 11	11:16	Bottlenosed and then sank	Seismic activity continued
May 15	11:04	Swimming, looked toward vessel, then sank	Seismic activity shut down
May 31	17:52	Bottlenosing	

No cetaceans or pinnipeds were exposed to 180 or 190 dB, respectively.

3.4 Implementation of Mitigation Measures

Mitigation measures that were implemented during the month of May include the safety radii and shut down and ramp up procedures. Marine mammal monitoring (visual, acoustic and aerial) was ongoing throughout the month. Passive acoustic monitoring using an “over-the-side” hydrophone occurred at night during seismic operations. NMFS’s vessel operation and marine mammal viewing guidelines to minimize vessel and aircraft impacts are continually implemented. Airguns were discharged at depths greater than 2 m (~6.6 ft). Details on changes to the mitigation measures are described below.

Sound Source Verification Study

The sound source verification (SSV) study took place in Beshta Bay, between Tyonek dock and Old Tyonek Creek over a period of three days from May 6-8. The results from the SSV study are presented in Table 7.

Table 7. Maximum threshold distances for the mitigation airgun and three airgun arrays. Distances are maximized over direction and environment and are based on the 90th percentile fits.

SPL _{rms90} Threshold (dB re 1 μPa)	Airgun Array			
	10 cui	440 cui	1200 cui	2400 cui
190	10 m	100 m	250 m	380 m
180	10 m	310 m	910 m	1400 m
160	280 m	2500 m	5300 m	9500 m ¹

¹This radius applies to receivers in water depths of approximately 25 m. The radius is substantially reduced for receivers in 10 m water depth, and it slightly reduced for receivers in water depths from 35-65m.

Safety Radii

On May 6, at the start of seismic activity, the modeled safety radii were implemented and the monitoring zone extended to 6.1 km. However, based on preliminary results from the SSV study, the monitoring zone increased to an area larger than modeled during the week of May 16-22. On May 25, the 160 dB monitoring zone increased to the measured monitoring zone of 9.5 km.

Aerial Survey

The area in which the aerial surveys covered expanded during the month of May due to the SSV results. At the start of seismic activity, aerial surveys extended from the Chuitna River to Middle River, approximately 10 km north and south of the operations area. Once the SSV study results were available, the aerial survey expanded to the southern end of the Big Susitna River to the McArthur River, approximately 25 km to the north and 20 km to the south of the operations area (Figure 1). The increase in aerial survey distance insured adequate coverage of the measured 160 dB monitoring zone.

3.5 Implementation of Conservation Recommendations

The conservation recommendations described in the Biological Opinion issued by NMFS were not stated as a condition, but rather designed to minimize adverse effects to the Cook Inlet beluga whale from in-water noise generated by the airguns during the Cook Inlet 3D Seismic Program. At this time APACHE has not implemented any of the conservation recommendations suggested by NMFS. If any of the conservation recommendations are implemented, NMFS will be notified and the effectiveness of the recommendation will be reported.